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Ontario Department of Education

Courses in Agriculture

FOR

PUBLIC AND SEPARATE SCHOOLS

1935



ISSUED BY AUTHORITY OF THE MINISTER OF EDUCATION
FOR TENTATIVE USE IN PUBLIC AND SEPARATE SCHOOLS

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NOTE

The courses outlined hereafter, cover the topics given in the Minimum and Supplementary courses under the heading "Nature Study and Agriculture" in the Courses of Study for Public and Separate Schools, 1934.

These courses replace former provisions for instruction in Agriculture and should be followed during the school year, 1935-36, in all schools in which Agriculture is taught as provided in Circular 56 or 56E.

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INTRODUCTION

INFORMATION FOR TEACHERS

The following is an outline of the prescribed work in Agriculture for Public and Separate Schools. It is divided into four courses, A, B, C, and D. The object is to provide separate courses each year of a four-year cycle in the ungraded schools so that there may not be too frequent repetition, but a wider interest stimulated. It is intended that in graded schools, Course A be taken in Junior III., B in Senior III., C in Junior IV., and D in Senior IV. A change from the above order is permissible in schools where Agriculture is not taught in all four grades, but the course taken in any grade should be one of A, B, C, or D. Each year's work is divided into monthly studies suitable to the season because emphasis upon Nature in agriculture and actual contact with real materials and observations are essential. The teacher should be guided by local conditions and cover each year, at least three-quarters of the course prescribed.

The problems or topics are stated as the pupils' Specific Objectives. Opposite each, the Suggested Activities of teacher and pupils are outlined to help make the work practical and cultural.

Note-book and project work by the pupils are important. By no means should the teacher dictate notes. The purpose of the note-book is to afford the pupil an opportunity to give expression to impressions that were made through investigations, experiments and discussions. Training in power to organize and clearly express facts and ideas renders more effective all written and oral composition of the school.

The teacher's **General Objectives** are included here to help give definite guidance in educating the pupil.

1. To stimulate an interest in rural life and in Agriculture as Canada's basic industry.
2. To have pupils appreciate that the problems of farm life offer as great a challenge for real ability as any other vocation.
3. To have pupils comprehend useful facts and principles of Agriculture and their practical application.
4. To develop the habits of relating cause and effect.
5. To develop pupils' powers of observation, reflection and expression.
6. To correlate the activities of the school work with those of the home and the community.

APPARATUS AND MATERIALS

The following list of equipment should be in every school where the four courses are undertaken and may be secured locally or from any firm dealing in laboratory apparatus. Expenditure for this purpose will be allowed as a part of the agricultural grant.

- 4 glass beakers, 400 c.c.
- 2 florence flasks, 250 c.c., with one holed rubber stopper to fit and a foot of glass tubing for each.
- 2 glass funnels, 60 to 80 mm. dia.
- 1 doz. or more test tubes, 6" x $\frac{3}{4}$ ".
- 1 test tube rack and brush.
- 2 evaporating dishes, 75 mm. dia.
- 1 convection current apparatus.
- 1 measuring cylinder (graduate) 100 c.c.
- 1 ball and ring for expansion.
- 1 chemical thermometer (fahrenheit).
- 1 barometer tube.
- 1 lb. mercury.

- 1 alcohol lamp or an electric hot plate.
- 1 tripod lens for every two pupils.
- Red and blue litmus paper and filter paper.
- Hydrochloric acid and slaked lime (calcium hydroxide).
- Samples of commercial fertilizers.
- Samples of insecticides.
- Samples of fungicides.
- Samples of grit and oyster-shell.
- Grafting wax.
- Half-dozen paring knives.
- A number of small tin or aluminum plates.
- 6 glass fruit jars, quart size.
- 1 doz. each of soup plates and saucers.
- A supply of 4" flower pots.
- Shallow boxes for planting seeds.
- A killing bottle and spreading board.
- Insect breeding cage or vivarium.
- One hand sprayer.

Selection of equipment should be made by the teacher year by year to meet the requirements of the course or courses taken.

References

All references in the following courses have been confined to six books and a number of bulletins. Four of the books selected are authorized for use in the schools of Ontario. These books are familiar to many teachers and are already in many school libraries. The other two books are moderately priced and have been used as references in the Normal Schools.

Below are given the abbreviations used as references under the objectives of the courses, the titles of the books, the publishers and prices.

1. A.&H.M.—Ontario Teachers' Manual, Agriculture and Horticulture, The Ryerson Press, 299 Queen St. West, Toronto. Price 35c.
2. N-S.M. —Ontario Teachers' Manual, Nature Study, The Ryerson Press. Price 39c.
3. H.S.B. —Botany for High Schools, authorized text for Lower School, Educational Book Co. Ltd., Toronto. Price 65c.
4. H.S.Z. —Zoology for High Schools, authorized text for Lower School, Educational Book Co. Ltd., Toronto. Price 75c.
5. A.P.S. —Agriculture for Public Schools, Educational Book Co. Ltd., Toronto. Price 70c.
6. C.A. H.S.—Canadian Agriculture for High Schools, Macmillan Company, Toronto. Price \$1.25.
7. O.B. —Ontario Department of Agriculture Bulletin.
8. D.B. —Dominion Department of Agriculture Bulletin.

One copy of each bulletin may be obtained by teachers on applying to the Publications Branch, Ontario Department of Agriculture, Toronto, or to the Publications Branch, Dominion Department of Agriculture, Ottawa. Teachers should not instruct pupils to write for these bulletins as the supply is limited and they cannot be sent to pupils. All bulletins should be carefully preserved since the supply of various issues is often exhausted and some bulletins are not reprinted.

In some cases the references given may not deal with the topics as fully as desired. Teachers should, therefore, try to secure each year for the school library one or two books on different topics and thus develop the necessary agricultural library.

AGRICULTURE—Course A

SEPTEMBER

School Fair—Garden Flowers—Weeds—Care of Garden

Specific Objectives

1. To make preparations for the school fair.
A. & H.M., pp. 149-152.

2. To visit, where possible, the local fall fair for observation of cattle, poultry.

3. To be able to recognize petunia, asters, marigolds, cosmos, nicotine, or other common annual garden flowers.
See Seed catalogues, seed packets.

4. To learn the form and use of stems, leaves, and roots of nasturtium, field mustard, or 2 other common flowering plants.
N-S.M., pp. 159-162.
H.S.B., pp. 10-15.

5. To know 10 common weeds and to collect, press, and neatly mount five or more of them.
D.B. 137.
O.B. 376.
N-S.M., pp. 245-246.

6. To prepare the garden for winter.

Suggested Activities

Find out what your local school fair requirements are and make preparations accordingly.

Assign observations to be made at the local fall fair concerning breeds of cattle and poultry.

Observe and discuss the general appearance of these garden annuals until each can be named at sight in the garden and in a bouquet.

Have the pupils write the name and a short description of each in note-books; and make a crayon or a water colour drawing of the one or more of their favourites.

Examine the flowers of the nasturtium and field mustard to find their calyx and sepals, corolla and petals, stamens, and pistil. Note that the calyx and corolla protect the stamens and pistil before the flower opens; that the showy corolla attracts insects; that the stamens produce pollen for the pistils; that the pistil bears seeds at maturity. Compare their stems, leaves, and roots and discuss their use in the life of the plant.

Observe and discuss the general appearance of 10 specimens. Direct and supervise the collecting, pressing, mounting and labelling.

Why are these plants called weeds?

Clean up garden refuse and burn it or plough it in. After ploughing or digging the garden, leave the surface rough. If necessary, add dressing of manure.

OCTOBER

Insects—Bulbs—Preparation of Garden for Winter

1. To learn how to prepare beds or borders in which to plant bulbs — tulips, narcissi, hyacinths, scillas, or crocuses.
C.A.H.S., pp. 64-65.
A. & H.M., pp. 33-34.

Dig the beds to a depth of over one foot; dig in rotted manure and, if clay, also add sand to put the soil in good condition ready for planting the bulbs later in the month.

2. To know the general appearance, habits and adaptation, life history and control of; grasshopper, cabbage butterfly and housefly.

N-S.M., pp. 165-169; 104-106; 150-152.

H.S.Z., pp. 5-16; 33-35; 27-31.

Observe these insects in their natural environment to find what they are doing and how they are adapted to their habits. How are they harmful?

Cage specimens and observe the main divisions of the body, number of legs and wings, and where these are attached. Make a drawing of one of these insects and label the parts represented.

Learn, with the aid of diagrams, the stages in the life history of each. Where is each stage commonly found? How does man commonly control each of these pests?

3. To be able to identify 10 common insects.

N-S.M., pp. 243-245.

H.S.Z., pp. 5-61.

Plan a class project in which pupils are to capture insects and bring to the class room for identification for preservation as part of a school collection. Have a prepared cyanide bottle on hand for killing. Keep it corked and label *poison*.

4. To know the general characteristics of insects.

See 2 above.

Review and compare the different adult insects observed in (3) to discover the number of legs, wings, and body divisions, feelers or antennae, each has. Note their breathing habit.

Record the common characteristics of all.

5. To plant one or two kinds of bulbs outdoors and indoors.

N-S.M., pp. 110-112.

A. & H.M., pp. 33-34.

C.A.H.S., pp. 64-65.

Outdoors set bulbs at a depth 3-4 times their own length. Set crocuses two inches apart; scillas, three inches; tulips, four inches; narcissi, daffodils and jonquils, six to eight inches apart. Press the earth down so that no air spaces are left into which water may settle and freeze.

Indoors plant bulbs in pots or cans.

NOVEMBER

Farm Products of the Locality—Habits and Adaptation of Common Small Mammals

1. To be able to identify the common farm grains and to know the chief uses of each. Wheat, oats, barley, rye, buckwheat, flax.

A.P.S., pp. 68-90.

Secure samples of each and help pupils to observe and compare them, noting size, shape, colour.

Discover which have a hull and which are hullless.

Discuss the chief uses of each, and have pupils make drawings and a record of their use in their note-books.

2. To be able to identify common root and tuber crops, and to know the chief uses of each. Turnip, mangel, carrot, sugar beet, potato.

Direct each pupil to bring one sample of each kind of root crop grown in the district, and a potato as a sample of a tuber crop.

Note the distinguishing features of each and discuss its special uses. Make a drawing of any two.

3. To identify the common forage crops grown in the district and to know their chief use.

A.P.S., pp. 102-132.

Secure a small sheaf of each. Make clear that green feed, silage and hay are classed as forage crops and that alfalfa, clovers, peas, beans, and vetches are among the best. Besides making good feed, legumes improved the soil. Show samples of these with nodules on their roots and explain the significance.

4. To identify common orchard crops.

Direct pupils to bring samples and observe the varieties of apples and pears commonly grown in the locality. Make a crayon or water colour drawing of two.

5. To know the dairy and poultry products of the locality and their importance.

Discuss what is done with the milk produced on the farm. From what part of milk is butter made? Cheese? What use is made of buttermilk? Whey? Emphasize that milk is an important cash product. Discuss the importance of chickens, turkeys, geese and ducks as a source of revenue.

6. To know the habits and adaptation of: bat, rabbit, groundhog, rat, mouse.

H.S.Z., p. 172; pp. 155-161; 186-187; 210-212; 208-210.

Identify and compare with the aid of pictures. Encourage pupils to tell what they know about their habits and adaptations. Then discuss where and how each spends the winter.

Direct pupils to collect pictures or make drawings of some of these mammals.

DECEMBER

Breeds and Winter Housing of Chickens

1. To learn the common breeds and classes of chickens and to know their origin and good points.

A. & H.M., pp. 72-79.

A.P.S., pp. 247-256.

C.A.H.S., pp 425-430

Discover the pupils' knowledge regarding breeds of poultry. Show pictures that illustrate the chief characteristics of the common breeds. Classify according to type or class and note the importance as producers of meat and eggs. Under the headings: Class, Breed, Varieties, Weights, help pupils to record in note-books. What are the advantages of keeping a single variety? Make picture clippings of breeds and mount them in note-books.

2. To learn how successful poultry keepers house their hens to keep them healthy and laying well.

A.P.S., pp. 261-268.

C.A.H.S., pp. 432-433.

O.B. 368.

Study a plan of a good poultry house in respect to location, dryness, lighting, ventilation, roosts, dropping boards, nests, feeding hoppers and drinking vessels, area of space for each hen, way of cleaning.

Write a story on "How to House Laying Hens During the Winter."

JANUARY

Breeds and Types of Cattle

1. To learn how to distinguish the common breeds of cattle and to know their origin and use.

A. & H.M., pp. 50-59.

A.P.S., pp. 226-232.

With the aid of pictures discover what breeds pupils can identify. Discuss details that distinguish each of the common breeds; compare their appearance and note their special merits and origin.

Help pupils to summarize the important points under headings: Breed, Distinguishing Points, Origin, Special Use.

2. To know the difference between the dairy type and the beef type of cattle.

A. & H.M., pp. 50-59.

A.P.S., pp. 226-232.

C.A.H.S., pp. 363-372.

Classify common breeds under two headings: (1) Those that are smooth and well fleshed, rectangular or brick shaped and blocky; (2) Those that are angular and triple-wedge shaped and with large udders. Which type of cattle is commonly kept in the community?

Debate—Resolved: that farmers in the community should keep beef cattle rather than dairy cattle.

3. To know what is meant by pedigreed stock.
A.P.S., pp. 217-220.

Explain that a cow (dam) or a bull (sire) of high quality and pure-bred ancestry of the same breed may be given a *name* and a *number* which are registered by the breeder or owner in the *herd-book* for that breed in the National Livestock Records Office, Ottawa. Discover any pedigreed cattle that may be in the community. Cattle not pure bred are either *grades* or *scrubs*.

4. To learn the chief cuts of beef and from which part of the carcass each is taken.
Chart—Dominion Department of Agriculture.

List all the cuts of meat that pupils can name. Make a chart or blackboard drawing of a beef animal and divide by means of lines to show where the various cuts are on the animal, namely: neck, chuck, prime or rib, porterhouse, sirloin, rump, round, flank, shank.

Find the current price of each of these cuts.

Why do the prices vary?

FEBRUARY

Heat and its Effect on Matter and Life

1. To know how heat is commonly produced.
N-S.M., pp. 230-233.

Explore what pupils know about this problem.

Emphasize that heat is produced by burning, by friction, by generating electricity with a generator driven by a water wheel and that the sun is our great source of heat.

Note-book Assignment: (1) How do we produce heat in winter to keep warm? (2) Why can we get much heat from coal, wood, oil, gasoline, and natural gas? (3) Why does oil prevent machinery from heating?

2. To know how we can cause water to exist as a solid, a liquid, a gas or vapour.
N-S.M., pp. 218-219.

Experiment and discuss to show the three states in which water may exist.

3. To find how the three states of matter are distinguished from one another.
N-S.M., pp. 218-219.

Assemble and examine three or four examples of solids, liquids, and gases, and discover how they differ.

4. To discover what effect heat and cold have on the volume of: (a) solids, (b) liquids, (c) gases.
N-S.M., pp. 192-197.

Show by experiments that heat expands solids, liquids and gases, and that they contract when cooled. Have pupils record the experiments.

5. To discover how and why the thermometer registers temperature.

Give each pupil practice in reading the thermometer. Discuss why the mercury or alcohol rises in the thermometer tube as the temperature increases and lowers as the temperature decreases. Make a drawing of a thermometer and label its parts. Mark clearly on the scale: boiling point, freezing point, zero.

6. To learn how heat is transferred through solids, liquids and gases.

N-S.M., pp. 233-238.

Experiment to show *conduction* of heat through iron or other metal.

Experiment to show that water is a poor conductor of heat, but that heat is transferred readily through water by *convection* currents. Experiment to show that heat is transferred in gases by convection currents. Discuss the cause of winds.

Explain why the handles of tea-kettles, tea-pots, etc., are made of wood. Why do thermos bottles keep the contents hot? Cold?

Explain why you can ventilate a room.

7. To realize the influence of heat and cold on plant and animal life.

N-S.M., pp. 125-127.

Elicit from pupils the influences they have observed that heat has on a plant and animal life. Discuss the cause of spring growth, the return of birds, the awakening of insect life, and the preparations made for winter by trees, birds, and insects.

MARCH

Farm Grains—Return of Birds

1. To know the difference between good and poor samples of wheat and oats.

A. & H.M., p. 114.

Supply good and poor samples of each and note the qualities of the good and the defects of the poor.

2. To learn how wheat is judged (For Form IV pupils only).

A. & H.M., p. 114.

A.P.S., pp. 77-78.

Supply a quart or more of each of two or three different samples of wheat: scales, pie plates, hand lenses, score card. Put score card on board for pupils to transfer to note-books. Then all may determine the value of samples with respect to (a) weight per bushel; (b) soundness; (c) purity; (d) plumpness and uniformity of kernels; (e) hardness; (f) colour true to variety. When all have followed directions and completed the cards, the average class score may be computed and taken as the best value.

3. To discover the percentage germination of samples of wheat and oats.

A. & H.M., p. 117.

As a class experiment prepare the ordinary soup plate germinator and in it have pupils put 50 or 100 seeds of wheat and in another put 50 or 100 seeds of oats. Keep germinators in a warm place. Do not allow the paper to dry out, nor have the seeds lying in water. After germination, divide the seeds into three lots, strong germination, weak germination, no germination. Calculate the percentage of strong germination.

4. To learn how to observe and identify birds returning in the spring.

H.S.Z., pp. 259-329.

N-S.M., p. 88.

Stimulate interest in the observation of birds by using good pictures or charts and discussing with the class the size and markings of a few common birds that are about to return. Plan with the class how to keep a record of birds as they return. Keep pictures before the class to aid in identification. Teach class the essential parts of a bird.

APRIL

Gardening

1. To plan the school garden and home gardens.

A. & H.M., pp. 23-25.

A.P.S., pp. 134-136; 140-143.

C.A.H.S., pp. 97-100.

Plan the layout of the garden. Measure the area and calculate with the class the number of square feet available for each pupil. Then draw a large plan to scale showing the plots and what is to be planted in each. Carefully plan the experimental plot. Select the experiment that interests pupils. Where school fair work is conducted, plan home garden according to directions given by Agricultural Representatives. In other cases, plan home garden to meet the needs of the pupil.

2. To learn how to start long season vegetable and flower plants indoors for transplanting later into the garden.

A. & H.M., pp. 83-85.

A.P.S., pp. 133-140.

C.A.H.S., pp. 102-104.

Discuss why it is necessary to start some plants in flats.

Plant tomato, cabbage, cauliflower, or pepper seeds in flats or shallow boxes and give proper care.

3. To learn how to observe and list early spring flowers.

N-S.M., pp. 55-60.

Interest pupils in watching and listing early spring flowers. Plan to have suitable nature books in the school library that may be used by the pupils for identifying specimens found.

MAY

Honey Bees—Gardening

1. To be able to identify the honey bee and to distinguish between the queen, workers and drones.

A. & H.M., p. 21.

H.S.Z., p. 53.

Secure a few worker bees and a few drones and place them in a bottle for observation.

Compare, with the aid of illustrations, the shape and size of the queen, workers and drones. Note their hairy bodies. Make an outline drawing of a queen, a worker, and a drone.

2. To consider the habits and industry of bees.

H.S.Z., pp. 52-57.

C.A.H.S., p. 159.

Observe and discuss the activities of bees in garden and field. What weather do they like best? Observe samples of honeycomb to note of what it is made and how. Make a drawing of a few cells.

3. To recognize and understand how bees develop in the hive, and what and how they are fed.

H.S.Z., pp. 54-57.

Examine a beehive to observe brood, or good pictures of brood to note egg, larva, and pupa in the cells. Compare with the stages in the life history of some other insect previously studied. Find what and how developing bees are fed. In notebook tell "How bees develop."

4. To learn what special work each kind of bee does in the community life of the hive.

D.B. 33.

Discover which bees gather pollen and nectar from the flowers. How do they get the nectar out? Where do they carry it? Find pollen baskets on the hind legs. Emphasize that the queen lays all the eggs, one in each cell of the brood chamber, to the extent of 2000 per day, and that the drones do not work. Consider all the work worker bees do in the hive. Write a story about "The Work of Honey-Bees."

5. To know the chief plants from which the workers gather nectar for making honey.
D.B. 33.

Discuss the sources and value of honey as food and its market price. Distinguish between clover honey and buckwheat honey.

6. To understand how bees help nature in pollinating flowers.
C.A.H.S., p. 159.

Observe bees as they visit flower after flower. Discuss their adaptation and importance as carriers of pollen from flower to flower. Discover what flowers they mainly visit.

7. To learn the parts of a Langstroth beehive and to know the use of each.
A. & H.M., p. 22.

Show a Langstroth beehive and observe the base, brood chamber with its frames, queen excluder, super with its frames, and top or lid. Discuss the purpose of each part. Make a drawing of a beehive and label the parts.

8. To consider how bee-keepers care for bees.
D.B. 33.

Discuss location of apiaries in the community. What is meant by swarming? What causes it? How may it be prevented? Discuss when and how honey is taken from the hives. How are bees kept during the winter?

9. To learn how to plant a garden.
A.P.S., pp. 141-142; 143-145.

Demonstrate and discuss how deep to plant various seeds and how far the rows should be apart. Show how to do transplanting and give practice in the same.

JUNE

Gardening

1. To care for the garden.
A.P.S., pp. 142-145.

Demonstrate how mulching by cultivation, weeding and thinning should be done, and discuss why.

Demonstrate when and how to water the garden.

Observe and discuss habits and service of toads, earthworms, ladybugs and birds in the garden.

Observe insect pests and demonstrate how to destroy them.

Write a story on "Why People Enjoy Gardening."

2. To review and summarize the important principles of the year's work.
3. To plan for the care of the garden during the summer vacation.

AGRICULTURE—Course B

SEPTEMBER

School Fair—Plant Life—Care of Garden

Specific Objectives

1. To make preparations for the school fair.
A. & H.M., pp. 149-152.
2. To visit where possible the local fall fair for observations on horses, vegetables and flowers.
3. To learn the characteristics and habits of growth of: geranium, coleus, canna.
4. To make a collection of five common weeds and press and neatly mount them. (These are not to be the same five as collected in Course A).
D.B. 137.
O.B. 376.
N-S.M., pp. 245-246.
5. To learn the structure and use of the flower parts and roots of the sweet pea, or a clover.
C.A.H.S., pp. 34-35.
A.P.S., pp. 54-57.
6. To prepare the school garden for the winter and spring.
A. & H.M., p. 24.

Suggested Activities

Find out what local school fair requirements are and make preparations accordingly.

Assign observations to be made at the local fall fair concerning breeds of horses, kinds of vegetables and varieties of flowers.

Observe these plants in gardens or in pots and discuss their identification, beauty and habits of growth.

Observe and discuss the general appearance and habits of these weeds. Supervise the collecting, pressing, mounting and labelling. Why are these plants called weeds?

Carefully examine the parts of the flower, noting calyx, corolla, stamens and pistil. Which part changes into the pod?

Make drawings of the separate parts.

Dig up peas or clovers so as not to injure the root. Wash and examine for nodules. Discuss the purpose of the root and the nature of the nodules.

Clean up all refuse left after the harvest and burn it or plough it down well. After ploughing or digging the garden, leave the surface rough for the winter. If necessary add a dressing of manure.

OCTOBER

Insects—Plant Cuttings—Bulbs

1. To know the general characteristics, life history, harm done and control of three of: aphid, wireworm, potato beetle, tomato worm, hessian fly.
H.S.Z., pp. 5-61.
A.P.S., pp. 97-101, 160-165, 177.
N-S.M., pp. 182-185.
D.B. 161.
C.A.H.S., pp. 131-187.
A. & H.M., pp. 162-182.
O.B. 359.
2. To know two of the following and how each is beneficial: ichneumon fly, lady - bird beetle, dragon fly, ground beetle, honey-bee, bumble bee. See references in 1 above.

Observe these, if possible, in their natural environment to find out what they are doing and how they are adapted to their habits.

Secure specimens and observe the shape, size, colour, special markings. Learn the life history of each. In what stage is it harmful and how it is commonly destroyed? Make a drawing of the stages of the life history of one.

Examine specimens or pictures; study some of their habits and how each is useful. Make a drawing of one of these insects in note-books.

3. To propagate geranium or coleus plants from cuttings.
N-S.M., pp. 113-114.
C.A.H.S., pp. 67-71.
H.S.B., p. 176.
4. To know how to care for plants indoors.
5. To plant bulb for outdoor or indoor bloom.

Demonstrate. Plant some in flower pots, cans or boxes. Care for them in school or at home and report progress from time to time.

Discuss watering, warmth, light and air requirements and probable pests.

See Course A, October.

NOVEMBER

Harvesting and Storing Vegetables—Trees—Woodlots

1. To know how to harvest and store such vegetables as: carrots, beets, potatoes, pumpkins.
O.B. 369.
A.P.S., pp. 158-160.
2. To recognize, compare, and know the use of five of: maple, elm, poplar, beech, oak, birch, willow, basswood, or other deciduous trees of the locality.
N-S.M., pp. 32-34, 61-64, 124-125.
3. To know two evergreen trees: spruce, pine, hemlock, cedar.
N-S.M., pp. 121-124.
H.S.B., p. 187.
4. To learn the benefits of woodlots on the farm.

Discuss the proper way to pull and top carrots and beets and to dig potatoes.

Emphasize that carrots and beets are covered in a box with sand or soil; that potatoes are put in slatted or open bins, and pumpkins and squash are kept spread out in a dry, cool place.

Observe these trees to become acquainted with the general appearance, bark, leaves and chief uses of these trees.

Follow activities outlined for deciduous trees.

Discuss importance from standpoint of fuel supply, timber, conservation of water supply.

DECEMBER

Poultry

1. To become familiar with the common breeds and classes of chickens.
A. & H.M., pp. 72-79.
A.P.S., pp. 247-256.
C.A.H.S., pp. 425-430.
2. To learn the kinds of feed required and a method of feeding for egg production.
A.P.S., pp. 261-264.
C.A.H.S., pp. 432-433.
O.B. 368.
3. To know conditions desirable for healthy fowl.
O.B. 368.
A.P.S. pp. 264-268.

Using pictures learn:

- 1 Asiatic: Cochin, Brahma, Langshan.
2. Mediterranean: White Leghorn, Black Minorca.
3. American: Barred Plymouth Rock, White Wyandotte, Rhode Island Red.
4. English: Buff Orpington. Classify into meat producers, egg producers, dual purpose.

Discuss feeds which should include grains, green feed, meat feed. Grit, oyster shell and charcoal should be supplied. Grain ration: wheat alone or mixed grains. Mash: commercial or home mixed in a hopper at all times. Green feed: sprouted oats, cabbage or mangels. Meat feed: buttermilk, skim-milk, meat meal or meat scrap; Quantity—1 lb. grain and 1 lb. mash daily for every 10 hens.

Supply plenty of clean fresh drinking water.

Discuss need of dryness, freedom from draughts, clean pens, clean drinking water, removal of sick birds, white-washing the inside of the building, provision for dusting to control lice.

JANUARY

Breeds of Horses and Their Care—Winter Birds

1. To learn how to distinguish common breeds of horses: Clydesdale, Percheron, Shire, Belgian and Hackney or Shetland Pony or Thoroughbred, and to know their origin and chief use.

A.P.S., pp. 218-226.

C.A.H.S., pp. 392-399.

2. To learn how to care for horses.

A.P.S., pp. 225-226.

C.A.H.S., pp. 339-402.

3. To be able to identify the winter birds of the locality and to know their feeding habits in relation to Agriculture

H.S.Z., pp. 259-267.

With the aid of pictures, discover what breeds pupils can identify. Point out the distinguishing features of each breed. Discuss their special use and note their origin. Summarize. Make newspaper clippings and mount in note-books.

Discuss the importance of exercising patience, good judgment and kindness in handling and caring for horses.

Discuss feeding, watering, grooming, and stabling: working horses, idle horses.

Make a chart of winter birds observed under the headings: date, bird, markings, feeding habits.

Attract birds by winter feeding.

FEBRUARY

Air Pressure—Weather Records—Value of Snow and Rain

1. To discover whether or not air has weight and pressure.

N-S.M., pp. 220-221.

2. To understand how the barometer works.

N-S.M., pp. 221-222.

3. To keep a weather record for two weeks.

N-S.M., p. 192.

4. To learn the value of snow in winter and rain in spring.

Perform experiments. Record results.

Experiment:

Set up a common barometer. Measure the height of the mercury in the tube above the level of the mercury in the dish or cistern. Discuss how this height of mercury exerts a pressure that balances the pressure of the air on the surface of the mercury in the dish. Keep records of the height of the mercury every day for one week. Did it vary? Why?

Outline a weather chart suitable for pupils' note-books and give directions what to observe and note, morning and evening, regarding the weather. Check records every other day.

Discuss the warmth of a blanket of snow and how it protects fall wheat and grass.

Discuss the change of snow to water in the spring and how it is beneficial to wells and farm crops.

MARCH

Seeds—Hotbed—Cold Frame—Garden Planning

1. To identify timothy, and one or more kinds of clover seed.

Secure seed from seed merchants or farmers. Examine timothy and red clover seed with a hand lens. Make a drawing of two of these.

2. To identify the seeds of five of: turnip, mangel, beet, onion, raddish, lettuce, pumpkin, squash, sunflower.
Secure seed from seed merchants.
Examine. Describe the size, shape and colour.
Make a drawing of at least three.
3. To plan a school garden.
A. & H.M., pp. 23-26.
Discuss what might be grown; size of garden and of plots; arrangement of flowers and vegetables. Draw a plan of the garden.
4. To plan a home garden.
O.B. 369, pp. 2-5.
Similar procedure as with school garden.
5. To learn the construction planting, use and care of a hotbed.
A. & H.M., pp. 83-85.
A.P.S., pp. 136-140.
O.B. 369, pp. 7-10.
Examine a hotbed or study diagrams or small model. Discuss or illustrate planting, why used, care necessary in ventilation, watering, weeding and thinning. If possible make a hotbed. Secure fresh horse manure. Old boards and a storm sash may be used. Start cabbage, tomatoes, or other plants.
6. To learn how to make a cold frame and know its use.
A. & H.M., pp. 87-88.
O.B. 369, p. 10.
Deal similarly with this as with a hotbed.

APRIL

Hotbeds—Buds—Crop Rotation

1. To make a list of plants started in the hotbeds of the locality.
Have pupils make a survey of what is grown and report. Make a list in note-books.
2. To learn the position, form and use of the parts of leaf and flower buds of: apple, pear, cherry or peach, and lilac or other small shrub.
C.A.H.S., pp. 12-14.
A. & H.M., pp. 80-81.
Examine the buds to note their position, shape and colour. How do the bud scales protect the inner parts?
3. To learn the meaning and value of crop rotations.
A.P.S., pp. 62-67.
C.A.H.S., pp. 101-179, 331-333.
Discover what pupils know about rotation of crops. Present a suitable three-year and a four-year crop rotation. Discuss order of crops and significance.

MAY

Gardening—Garden Flowers—Lawns

1. To plant a garden.
O.B. 369.
See Course A, April and May.
Guide pupils in proper preparation and planting of vegetables or farm crops and flowers in school or home garden.
2. To know the purpose and practice of cultivating a garden during the growth period.
See Course A, June, and 1 above.
Discuss reasons for cultivating, and demonstrate in school garden. Have pupils cultivate their plots.
3. To make lists of annual, biennial and perennial flowers commonly grown in the home or school garden.
Consult seed catalogues.
C.A.H.S., pp. 122-123.
Discuss meaning of annual, biennial and perennial plants. Have pupils make a survey of those commonly grown in vicinity and make a list in note-books.

4. To know how to prepare and care for a lawn.
A.P.S., pp. 128-129, 339.
C.A.H.S., p. 123.

Urban: To plant and care for in a school or home plot a pleasing combination of any two or more of the following: geraniums, coleus, castor beans, zinnias, asters, marigolds, sweet peas, etc.

Discuss, preparing soil, levelling, seeding, rolling and annual care. A good mixture is, Kentucky blue grass, red top, 10 lbs. each, with 1 lb. white dutch clover. Ammonium sulphate is good as a fertilizer as it checks growth of weeds.

Project: Plan, plant and care for the desired flower plot. Observe other flower beds to note arrangement.

JUNE

Gardening—Reforestation

1. To care for garden.
See Course A, June.
2. To know what kind of lands should be reforested and why.

Discuss and locate any areas in the district that have been reforested and why.

Course C

SEPTEMBER

School Fair—Ornamental Shrubs—Weed Seeds—Care of Garden

Specific Objectives

1. To make preparations for the school fair.
A. & H.M., pp. 149-152.
2. To visit, where possible, the local fall fair for observation of swine, apples and other fruits.
3. To learn how to select and prepare common vegetables for exhibit.
O.B. 338.
4. To know three ornamental shrubs and one vine.
5. To make a collection of five weed seeds and be able to identify them.
D.B. 137.
O.B. 376.
6. To prepare the school garden for the winter and spring.
A. & H.M., p. 24.

Suggested Activities

Find out what local school fair requirements are and make preparations accordingly.

Assign observations to be made at the fair concerning breeds of swine and varieties of apples and other fruits.

Compare good and poor vegetables as to size, shape and quality and how to prepare them for exhibit.

Note the appearance and branching habits of the shrubs and decide why they are ornamental, which are *deciduous* and which *evergreen*? How is the vine observed adapted for climbing?

With the aid of a hand lens observe the shape and markings of weed seeds. Make an enlarged drawing of five.

Clean up all refuse left after the harvest and burn it, or plough it down well. After ploughing or digging the garden, leave the surface rough for the winter. If necessary, add a dressing of manure.

OCTOBER

Insects—Bulbs—House Plants—Fungi—Soils

1. To know the general appearance, life history, harm done and control of two of: codling moth (apple worm), oyster shell scale, or San Jose scale, apple maggot (railroad worm).
H.S.Z., pp. 5-61.
A. & H.M., pp. 162-182.
O.B. 356.

Secure apples and twigs affected by these insects and observe the nature of their work and the harm done.

Cut apples and try to find the apple worm and the railroad worm. Examine them, noting their size and colour.

Lift off the scales and try to find the small eggs (Oyster shell) or insect (San José Scale) under them. Examine with a hand lens. Learn the life history of each, harm it does, and how it is usually destroyed.

Make a drawing of the affected parts where possible.

2. To plant bulbs for indoor and outdoor bloom.
3. To be able to recognize geranium, coleus, begonia, fern, or other common house plants and know how to care for them.
N-S.M., pp. 113-114.
C.A.H.S., pp. 68-71.

See Course A, October.

Observe these plants in pots and discuss their general appearance, beauty and habits of growth. For propagation and care, see Course B, October.

4. To be able to identify and give the harm done by, and the remedy for: black knot, apple scab, potato scab.
A. & H.M., pp. 104-105, 158, 168.
H.S.B., pp. 52-55.
A.P.S., pp. 174-175.
5. To collect samples of sand, clay, loam, humus.
A.P.S., pp. 16-18.

Secure samples of each. Observe and discuss their general appearance, the harm done and common methods of control. Make drawings of two of them.

Show sample, discuss where these soils may be obtained and have pupils collect and put in labelled jars or large bottles for a school collection and later use.

NOVEMBER

Apples—Winter Buds—Bulbs

1. To be able to identify five of: Northern Spy, Tolman Sweet, Snow, McIntosh Red, Ben Davis, Alexander, Baldwin, Melba, Delicious, Baxter, or other common varieties of apples.
D.B. 55.

Have pupils bring in these apples. Observe and compare their shape, size, colour and other outstanding features.

Learn the chief use of each, as cooking or eating raw, and the season when used.

Record these points in note-books. Make a crayon or water colour drawing of the one you like best.

2. To learn to judge apples.
A. & H.M., pp. 106-107.

Have pupils bring a basket of a common variety of apples. Put a score card on the blackboard (see A. & H. Manual), and have pupils copy it in note-books. Discuss the points to be noted in judging and have pupils judge the apples and fill in the score card. Judge, (1) single apples, and (2) plates of apples.

3. To learn how apples are packed and stored.

A. & H.M., pp. 107-108.

D.B. 69.

Secure some apples, hampers or baskets, and an apple box; explain how they are packed. How are apples packed in barrels for export?

Find out how they are stored locally. What are the proper conditions of temperature and ventilation for storage?

4. To find out the structure and use of winter buds found on two or more of: poplar, horse chestnut, maple, lilac, dogwood box alder, elder, or common trees or shrubs.

See reference in Course B, May.

H.S.B., pp. 126-131.

C.A.H.S., pp. 12-14

Secure twigs of these trees or shrubs and examine the buds and pick them apart. Note that the outer parts protect the inner from injury by rain, hail, snow and loss of moisture. Draw a twig showing end and side buds and bud scales.

5. To investigate the structure of an onion or tulip bulb, and learn the purpose of the parts.

C.A.H.S., pp. 64-65.

H.S.B., p. 216.

Secure one of these. Cut cross-wise and length-wise. Examine and make a drawing of what is observed. Discuss the relation and use of the parts.

DECEMBER

Parts, Care and Candling of Eggs—Culling Poultry

1. To learn the parts of an egg and the purpose of these parts.

Break a fresh egg into a saucer. Note the yolk, yolk membrane and germ spot, thick white, thin white, chalazae. Examine shell to show membranes and air cell. The white and yolk contain food elements for the developing of the chick during incubation.

2. To study conditions for the care of eggs.

O.B. 368, pp. 88-89.

Discuss the need of keeping nests clean; gathering at least once a day; keeping in a cool place free from odours; marketing once a week.

3. To learn how to candle eggs and the practical use.

D.B. 41.

Use electric light or oil lamp with metal or cardboard candling box. Compare size of air cell and appearance of the yolk of fresh and old eggs. Emphasize that the condition of an egg may be seen by candling and that the eggs are graded according to appearance, size of air cell and weight.

4. To know the proper way to pack eggs for shipping.

D.B. Leaf. 1.

Demonstrate how eggs are packed in cartons and crates for shipment. Discuss reasons. Why should extra large or thin-shelled eggs not be included?

5. To know a method of culling poultry.

O.B. 368, pp. 15-24.

Discuss, as indications of egg production: appearance of feathers; shape of body; colour changes in eye ring, beak, shanks of yellow skinned breeds; space between pubic bones and keel. Instruct pupils to observe these conditions in flocks during the winter. (During May and June poor layers should be removed.)

JANUARY

Breeds and Types of Swine—Silos and Silage

1. To know the distinguishing features of: Yorkshire, Tamworth, Berkshire and Chester White or Poland China hogs.
A. & H.M., pp. 59-64.
A.P.S., pp. 240-244.
C.A.H.S., pp. 418-421.

Discover, with the aid of pictures, which breeds the pupils can identify. Point out the distinguishing features of each breed with respect to colour, ears, nose and general shape.

What breeds are kept in the locality?

2. To learn what is looked for in a good bacon hog.
C.A.H.S., pp. 416-418.

Make arrangements, if possible, with a good judge of hogs or the agricultural representative to meet with your class at a hog pen where he can show the qualities of a high grade bacon hog. Discuss the chief points with the aid of pictures.

3. To learn how to house and feed hogs.
A.P.S., p. 245.
C.A.H.S., pp. 422-423.

Elicit from rural pupils when, what, and how they feed their hogs. Emphasize that hogs need proper housing and that they are usually profitable because they may be fed partly on such by-products as skim milk, buttermilk, whey, mixed with chopped grain; and pasture. Hogs should not be obliged to live and lie in dirty, wet pens. They appreciate a good, dry bed.

4. To find out the importance and construction of silos.
A.P.S., pp. 130-132.
A. & H.M., pp. 182-185.

Have pupils tell what they know concerning silos, and then stress the chief points of their construction and use.

Make a survey of the kinds of silos in the district. What ensilage is stored in them?

5. To be able to distinguish between dent and flint corn and to know the principle use of each.
A. & H.M., p. 116.
A.P.S., pp. 106-109.

Examine dent and flint corn to note the difference in the kernels. Discuss their main use.

6. To be able to distinguish between a good and a poor ear of corn.

Examine ears noting good and poor shapes, butts, tips, rows, kernels.

FEBRUARY

Common Soils and Soil Water

1. To be able to identify the common soils and to know their distinguishing features.
A.P.S., pp. 16-18.
A. & H.M., p. 98.
C.A.H.S., pp. 269-270.

Supply each pupil with a sample of sand, clay, humus, and loam in a pie plate. Examine each sample with the aid of a hand lens and note how they differ in respect to colour, size and shape of particles. Which becomes sticky when wet? Emphasize that loams are mixtures of sand, clay and humus. Distinguish between light and heavy soils.

2. To learn the importance of humus in soil.
A.P.S., pp. 23-24.

Set up an experiment with two small flower pots of the same size. Into one put dry sand and into the other put an equal quantity of dry sand and humus mixed. Add the same amount of water to each pot and find out which retained the greater amount of water.

Discuss the value of humus as plant food.

3. To distinguish between free and capillary water in soil.
A.P.S., pp. 21-23.
C.A.H.S., pp. 284-288.

Discuss the action of water during and after a heavy rain.

Set up experiments with dry sand and loam to show the action of capillary water in soils.

Discuss how water finds its way to the roots of plants during dry weather.

Discuss the purpose of drainage.

4. To understand why mulching soil conserves capillary water.
C.A.H.S., pp. 288-291.
A.P.S., pp. 29-30.

Set up an experiment to show that a mulch prevents capillary water from rising to the surface to be evaporated.

MARCH

Levers—Care of Machinery—Incubation—Baby Chicks

1. To learn the principles of the three forms of levers and applications in whiffle-trees, pruning-hooks, wheel - barrows, shears or other farm and garden tools and machines.
H.S. Physics, pp. 61-65.

Demonstrate to pupils how the three types of levers work.

Make drawings representing the three kinds of levers.

Observe tools and machines, if possible, in which the principles are applied.

2. To know how and why to care for farm tools and machinery.
O.B. 300.

Discuss the importance of keeping tools clean, dry, painted, oiled and free from rust.

3. To know how to set a hen.
A.P.S., pp. 260-261.
O.B. 368.

Discuss how it is done. Write in note-books the steps to be followed. Encourage pupils to set and care for a hen at home, where possible.

4. To know the importance of the incubator in hatching chicks.
A. & H.M., pp. 94-95.
A.P.S., pp. 258-261.
O.B. 368.

Discuss the advantages of the incubator as compared with the hen in respect to:

(1) early chicks, (2) large numbers when required, (3) large numbers of same age, (4) housing and care.

5. To learn how to feed and care for young chicks.
O.B. 368.
A.P.S., p. 261.

Visit, if possible, a chick hatchery, or a farm, where chickens are being reared.

Observe the housing, how and when the young chicks are fed, and the kind of food and drink they are given.

Discuss housing and proper kinds of feeds.

6. To understand why it is important to have well-bred and early-hatched chicks.
D.B. 1, pp. 22-24.
O.B. 368.
A.P.S., pp. 252-254.

Find out how local successful poultrymen and chick-hatcheries select eggs for hatching.

Discuss the value of well-bred fowl.

Note that the early-hatched chickens are ready for market and begin to lay earlier than the late-hatched ones.

7. To learn how day-old chicks are marketed.

Find out how hatcheries market their chicks.
Discuss the methods with the class.

APRIL

Gardening—Pruning—Grafting—Germination

1. To make preparations for gardening and transplanting. See Course A, April and May. C.A.H.S., pp. 139-145. O.B. 314, pp. 7-8, 13, 18.
Discuss how it is done.
Prepare garden and plots at home or in school garden.
2. To learn the purpose and method of pruning trees and shrubs; maple and other shade trees; apple, pear or other fruit trees; garden shrubs. A. & H.M., pp. 29-30, 82. O.B. 323, pp. 21-38. O.B. 357.
If convenient, visit places where trees or shrubs have been, or are being pruned. Using specimens brought to the classroom, demonstrate how it is done or prune a tree or shrub out of doors.
Discuss the reasons for pruning and how it should be done.
3. To learn the purpose and method of grafting apple, pear or other fruit trees. A. & H.M., pp. 130-132. O.B. 324. O.B. 357. D.B. 55, pp. 18-23.
If convenient, visit trees or orchards where the operations are being, or have been performed. Bring branches, and scions as well as tools and other material, to the class room and demonstrate how it is done.
Discuss the purpose and have pupils record the steps in the processes.
If possible, graft a tree on the grounds or in the neighbourhood.
4. To discover that air, moisture, warmth and good seed are required for successful germination of seeds. H.S.B., pp. 52-56.
Set up one plate germinator with all the requirements, and others with one of each of the requirements lacking. Compare and generalize.
5. To test for percentage germination of seeds. A. & H.M., pp. 85-86; 117-118. A.P.S., p. 78.
Use plates, saucers, blotters or other materials and test corn, wheat or other seeds. Compute the percentage that germinate strongly. What is the value of a germination test?

MAY

Garden—Tillage—Mulching—Shrubs—Bulbs and Tubers

1. To plant the garden. See Course A and B, May.
See Course A or B, May.
2. To know what is meant by, and the purpose of: ploughing, discing, harrowing, rolling. C.A.H.S., pp. 459-480.
Observe, if convenient, how these operations are performed.
Discuss the purpose of each of these farm practices.
Use pictures, if possible, for illustration.
3. To learn the methods and value of mulching. A.P.S., pp. 28-30; 153-154; 192-194. A. & H.M., pp. 92, 96.
Find out how to put on a straw mulch and to form a dust mulch. Observe strawberry and other beds and plots where mulching is practised.
Discuss how and when it is done, and its value. Keep a dust mulch on the garden plots at school or home.

4. To make a list of the common shrubs, spring planted bulbs, and tubers, as spirea, hydrangea, lilac, barberry, privet, cedar; lily, gladiolus; dahlia, potato, or others in the locality.

C.A.H.S., pp. 120-125.

See Nursery Catalogues.

Have pupils find out at home what shrubs, bulbs and tubers, are grown. Discuss and compare these in class. Have pupils make lists of the common ones of the district in their note-books.

JUNE

Care of Garden—Common Insect Pests—Review

1. To care for the garden.
2. To observe and note harm done by two of white grub, wireworms and cutworms, and how they are controlled.
3. To observe the harm done and habits of the tent caterpillar.
4. To review and summarize the important principles of the year's work.
5. To plan for the care of the garden during the summer vacation.

See Course A, June.

Be on the lookout for these pests in the garden and elsewhere. Note their appearance from specimens or pictures and discuss the harm they do and how they can be controlled.

Discover these in orchards or other trees and note the time of day they do harm and how rapidly they grow. Suggest a method of control.

Course D

SEPTEMBER

School Fair—Legumes and Grasses—Plant Diseases Beautification of Grounds—Fall Care of Garden

Specified Objectives

1. To prepare for the school fair.
2. To visit, where possible, the local fall fair for observation of breeds of sheep and geese, ducks and turkeys.
3. To be able to identify five common legumes and grasses.
4. To learn the recognition and control of any two of: loose smut of oats, grain rust, late blight of potatoes.

A. & H.M., pp. 149-152.

O.B. 269.

A. & H.M., pp. 104-105, 160, 168.

A.P.S., pp. 92-95, 173-175.

Suggested Activities

Find out what your local school fair requirements are and make preparations accordingly.

Assign observations to be made at the local fair regarding breeds of sheep and geese, ducks and turkeys.

Collect for study five legumes and grasses. Note how the grasses resemble each other and differ from one another. Likewise, compare the legumes.

What chief uses are made of these legumes and grasses?

Collect samples for observation with the aid of a hand lens. Note the damage these diseases do and discuss how they are controlled.

5. To learn how to beautify home and school grounds.
A. & H.M., pp. 152-157.
A.P.S., pp. 337-339.

First consider the beautification of your own school grounds. Discuss arrangement of flower beds and shrubs for beautification of grounds. Apply them for the improvement of your school grounds.

6. To prepare the school garden for winter.
A. & H.M., p. 24.

Clean up refuse left after harvesting the crop and burn it or plough it under. After digging or ploughing the garden, leave the surface rough for the winter. If necessary, add dressing of manure.

OCTOBER

Weeds—Insects—Bulbs

1. To know how weed seeds are dispersed.
N-S.M., pp. 162-165.
H.S.B., pp. 39-44.
O.B. 376.

Discover what the pupils know about how weed seeds are spread. Have them bring specimens of seeds scattered by wind, water, animals, or explosive fruits.

Discuss and summarize, with examples, the ways in which the above agencies and man bring about the dispersal of weed seeds.

2. To know why weeds are harmful and how they are controlled.
O.B. 376.

Discuss how weeds crowd out crops, rob of sunlight, food, and moisture, harbour plant diseases and insect pests, increase labour and expense in cultivation and harvesting, and lessen the value of farm products and the farm. Consider as means of control (1) Importance of clean seed, (2) Destruction of weeds before going to seed by cutting, pulling and cultivation of growing crops, (3) Use of crop rotations, (4) Summer fallowing for perennials such as perennial sow thistle, Canada thistle, quack grass, field bindweed.

3. To know how the house fly, potato beetle, bumble bee, grasshopper, tent caterpillar; warble fly, or codling moth or corn borer; tomato worm or cabbage butterfly; pass the winter.
See Course B, October.

Secure the winter stage of as many of these as possible.

Learn the life history of each and find where and in which stage the winter is passed.

Make drawings of two of these winter stages.

4. To plant fall bulbs.

See Course A, October.

NOVEMBER

Bees—Fall Ploughing—Winter Care of Shrubs and Perennials

1. To consider the fall and winter care of bees.
See Course A, May.

Observe, where possible, how beekeepers of the locality are caring for their bees during the fall and winter.

Discuss the methods used: (1) Outdoors, (2) Indoors.

2. To know the value of fall ploughing.
C.A.H.S., pp. 296-298.

See Course C, May.

Discuss the importance of early and deep ploughing; the effect upon the soil, vegetable matter, insects and weeds.

3. To know how to prepare shrubs and perennials for the winter.

Observe how it is done around well-kept public and private lawns and in flower beds. (Urban.)

Discuss reasons and methods for preparing shrubs and perennials for winter. Why cover perennial beds? What materials are used?

Have pupils help, where possible, to cover, or otherwise prepare flower beds for the winter.

DECEMBER

Composition—Care and Pasteurization of Milk—Milk Products— Geese, Ducks and Turkeys

1. To determine the general composition of milk.

A. & H.M., pp. 121, Ex. 5-6.
A.P.S., pp. 290-292.

Follow instructions in reference in A. & H.M.

Discuss why milk is an important food and correlate with hygiene teaching.

2. To understand how to keep milk clean and why?

A.P.S., pp. 290-293.
A. & H.M., pp. 119-121, 190-192.

Discuss how dirt gets into the milk and how it may be prevented.

Emphasize the need of care in handling milk to avoid the spread of disease, early souring, and tainting, through unsanitary conditions.

3. To know why milk is pasteurized and how it is done.

C.A.H.S., p. 233.
A. & H.M., p. 120, Ex. 4.

Pasteurize a small quantity of milk in a large test-tube placed in a vessel of water. Heat to 142° for thirty minutes. Plug the tube with batting and cool to 40° to 50° F. Set aside with another tube of unpasteurized milk and compare time of souring of each sample.

Visit a dairy, if possible, to observe pasteurization.

4. To know common milk products and from what constituent of milk they are made.

A.P.S., pp. 290-292.

Discuss that butter is made of the fat in milk separated by churning the cream and that cheese is made from casein or curd and most of the fat in milk. Other milk products might be discussed.

5. To learn to recognize the common breeds of geese, ducks and turkeys and gain a knowledge of their uses.

A.P.S., pp. 269-273.

Observe and discuss the breeds of geese, ducks and turkeys, kept on farms in the community. By the use of pictures give to the class the characteristics of the Toulouse, or Gray goose and one other variety; the Rouen and Pekin duck and the Bronze turkey. Briefly discuss the fact that these fowl are not kept for the production of eggs in large numbers, and that their chief use is as table fowl.

JANUARY

Breeds of Sheep, Their Importance and Their Care

1. To be able to identify the common breeds of sheep and to know the type of each.

A. & H.M., pp. 64-72.
C.A.H.S., pp. 403-412.

Explore with the aid of pictures what breeds the pupils can identify. Make a survey of the breeds kept in the locality. Distinguish between Cotswolds, Lincolns, and Leicesters as long woolled breeds; and Southdowns, Shropshires and Oxfords as medium woolled breeds. Where are the fine woolled breeds commonly raised?

Make clippings of pictures from agricultural papers and mount them in note-books.

2. To learn the advantages of sheep raising.

A.P.S., pp. 237-239.

C.A.H.S., pp. 412-413.

Discuss the comparatively large and quick returns on money invested in sheep; a crop of lambs and a crop of wool per year. They are excellent foragers and weed destroyers during the summer. During winter months they require inexpensive stabling. New-born lambs should not become chilled.

3. To learn how local wool is marketed.

C.A.H.S., pp. 414.

Have pupils investigate the grading and marketing of wool. Write a story on "Co-operative Grading and Marketing of Wool."

FEBRUARY

Composition and Condition of Soils

1. To discover the composition of a good garden soil.

A. & H.M., p. 98.

A.P.S., p. 16.

CA.H.S., pp. 278-279.

Experiment: Half fill a wide-mouthed bottle or jar with garden loam. Add enough water to fill the jar nearly full. Close mouth of bottle and shake well for a minute; then set it aside to settle. After half an hour, observe how the soil particles settled, noting that coarse sand is at the bottom, fine sand next, then clay, and on top, the dark humus. What kinds of soil does the garden loam contain? Explain that the sorting action of the water causes the heaviest particles to settle first and the lightest last. Why is soil in valleys darker than on hilltops?

2. To know that good soil is composed of both mineral and organic matter.

A.P.S., pp. 8-18.

C.A.H.S., pp. 269-271.

Experiment: On a piece of mica or on a thin pie plate put a pinch of clay and strongly heat and stir for 1-2 minutes. Repeat, using sand, then humus, then garden loam. Have pupils note that the clay and the sand do not burn and that the humus burns to an ash. Explain that sand and clay particles were formed by weathering agents that break up rocks into sand and clay, and that humus is formed by agents which cause plants and animals to decay. The sand and clay particles are called *mineral matter* and the humus, *organic matter*.

Is barnyard manure mineral or organic matter?

Why do soils in bush fires burn so readily?

3. To test soils for acid and alkaline properties.

A. & H.M., pp. 98-99.

A.P.S., p. 19.

C.A.H.S., pp. 271-275.

Demonstrate that vinegar, because it is sour or acid, turns blue litmus red, and that wet lime or lime water, because it is alkaline, turns red litmus blue. Test samples of wet soil with red and with blue litmus by leaving them in close contact for five minutes to find which are acid or neutral. Field, garden, and orchard crops grow best on slightly alkaline soils.

4. To understand the effect of adding lime or wood ashes to an acid or sour soil.

C.A.H.S., pp. 273-275.

Mix a spoonful of lime with a plate full of wet *acid* soil. Test with red and blue litmus papers. Note what effect the lime has on the sour soil.

5. To understand the effect of adding lime to a clay soil.

A. & H.M., p. 100, Ex. 7.

6. To realize that earthworms and soil bacteria are important agents for changing partly decayed plant and animal matter into humus.

A.P.S., pp. 14-15.

C.A.H.S., p. 252.

Divide a plate full of wet clay soil into two parts. To one add a spoonful of lime and mix well. Set the two samples aside and let them dry out. Examine to find what effect the addition of lime has on clay soil.

Discover what pupils know about the habits of earthworms. Explain that they eat leaves, dead grass and manure and pass these on as humus, and that soil bacteria causes dead leaves and other organic matter in soil to decay into humus which makes the soil loose and causes plants to grow well.

MARCH

Fertilizers

1. To distinguish between natural fertilizers and commercial fertilizers.

A.P.S., pp. 54-59.

A. & H.M., pp. 195-198.

O.B. 364.

D.B. 145.

Make clear that leguminous crops, rye, oats and other similar crops ploughed under are classed as green manure, and are natural fertilizers. Sodium nitrate, acid phosphate, muriate of potash and similar materials, are classed as commercial fertilizers.

Show sample of some common commercial fertilizers.

2. To know the value of legumes and other kinds of green manure.

A.P.S., pp. 54-57.

C.A.H.S., pp. 308-309.

See 1 above.

Discover that legumes, besides adding organic matter to the soil, enrich it by taking nitrogen from the air. (See Course B, September.)

3. To know the value of barnyard manure and how it may be conserved.

A.P.S., pp. 58-59.

C.A.H.S., p. 309.

Observe and discuss good methods of handling manure and conserving its value by keeping it in a shed or enclosed space.

Emphasize its value as compared with other fertilizers.

Why is much of its value lost by leaving it exposed to rains and the weather?

Show pictures illustrating good methods of conserving its value; ways in which much of its value is lost.

4. To learn the purpose of commercial fertilizers; types; their special value; means of application.

C.A.H.S., pp. 305-312.

See 1, above.

Discuss why fertilizers are necessary; that different kinds of soils and plants require different fertilizers. Show that there are three main types of commercial fertilizers; nitrogen, phosphorus (phosphate), potassium (potash). Learn their special values. Name at least two good examples of each. What are complete fertilizers? Their value? What is the value of lime?

Discuss how fertilizers may be applied to the soil.

5. To test the value of fertilizers in a field or garden.

Discover how pupils would test the value. Stake off parts of a garden or field and make tests of two or three kinds of fertilizers.

APRIL

Gardening—Care of Tools—Orcharding

1. To plan for garden work. See Course A, April.
2. To know how to care for garden tools. Elicit from the pupils the care that should be given to the tools.
See Course C, March. Have pupils clean the tools and put them away after using.
3. To learn favourable locations for an orchard. Discuss the slope, kind of soil, drainage.
O.B. 323.
D.B. 55.
D.B. 129.
4. To know how to plant a tree. Demonstrate how it is done.
C.A.H.S., pp. 125-127. Have pupils help plant a tree in the school grounds.
5. To know how to prune a young tree. Observe trees that have been pruned.
O.B. 323. Discuss the reasons for pruning.
C.A.H.S., pp. 126-127. Demonstrate by using a small tree or a branch.
Show pictures of properly pruned trees.
6. To learn how a young tree is developed in a nursery. Discover that an apple tree growing from seed, is not likely to be true to variety.
D.B. 55. Explain that a young nursery tree is grafted.
7. To learn the care that should be given to the orchard during the various seasons. Observe and discuss good orchard practices of the locality.
O.B. 323. Discuss the value of cultivation, pruning, spraying.
D.B. 55. When and how should these be done?
D.B. 129.

MAY

Gardening—Insecticides and Fungicides—Sprayer

1. To plan the garden. See Course A, May.
See Course A, May.
2. To know the difference between the use of insecticides and fungicides. Elicit from the pupils the fact that different kinds of enemies of plant require different treatment.
See references for Course B, October. Discuss the use of insecticides for insects, and fungicides for fungus growths, giving an example of each.
O.B. 351.
3. To know that biting insects require certain sprays as poisons: paris green, arsenate of lead; that sucking insects require contact sprays as: soap solution, nicotine, lime-sulphur. Discover that some insects as grasshoppers, potato beetles and cabbage butterfly, eat the plants; that plant lice and San José scale, suck the juice by means of a sucking tube. Give specific remedies for each of several insects as: potato beetle, cabbage butterfly, grasshopper, codling moth, tent caterpillar, plant lice or aphids, scale insects.
See 2, above. Have pupils list these in their note-books.
O.B. 356.
D.B. 31.
D.B. 129.

4. To learn a good spray for each of: potato scab, apple scab.

See 3, above.

H.S.B., pp. 52-61.

A.P.S., pp. 173-176.

O.B. 351.

Discover what remedies the pupils know.

Demonstrate how formalin may be used for potato scab. Have pupils treat some potatoes, if convenient, and plant in an experimental plot.

Discuss the use of bordeaux mixture for apple scab.

5. To see how a common sprayer is used.

Obtain a small hand sprayer and demonstrate its use.

JUNE

See Course C, June.



